

RJ LeeGroup, Inc.

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The Materials Characterization Specialists

June 26, 2002

Dr. Peter S. J. Lees, CIH
4415 Underwood Road
Baltimore, MD 21218-1151

RE: Bulk Asbestos Analyses
RJ Lee Group Project ESH202758

Dear Dr. Lees:

RJ Lee Group has completed the analyses of the bulk samples collected at a home in Averil Park, NY. The bulk samples were received at RJ Lee Group on March 7 and 22, 2002. Each sample was assigned an RJ Lee Group sample number as indicated in the attached tables.

Bulk Samples

Examination of four of the samples was performed using polarized light microscopy (PLM) following the method outlined in EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials. The results are presented in the attached Table 1. Chrysotile asbestos was identified at trace quantities in the joint compounds.

Vermiculite Insulation Samples

Each sample of expanded vermiculite attic insulation was weighed and dried in a low temperature oven to determine the moisture content. After the sample was dried, it was wet screened through a 500 µm (35 mesh) sieve to produce a coarse and fine fraction. Each fraction was dried, weighed, and analyzed using polarized light microscopy (PLM) following the method outlined in EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials. The results are presented in the attached Table 2. The asbestiform amphibole minerals tremolite/actinolite were observed in all samples. As you are aware, PLM cannot distinguish between the regulated asbestos amphiboles (tremolite asbestos and actinolite asbestos) and the non-regulated amphiboles winchite and richterite.

RJ Lee Group is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP, #101208-00) for selected test methods for airborne asbestos fiber analysis (TEM), asbestos fiber analysis (PLM), New York State Department of Health Environmental Laboratory Approval Program (ELAP), and by the American Industrial Hygiene Association (AIHA). This test report only relates to the items tested. NVLAP

Dr. Peter S. J. Lees, CIH
June 26, 2002

Page 2 of 4

accreditation does not imply endorsement by NVLAP or any agency of the U.S. Government. This report may be reproduced in full.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the sample covered by this report, RJ Lee Group will store the sample for a period of ninety (90) days before discarding. A shipping and handling fee will be assessed for the return of any sample.

If you have any questions on this report or if we can be of further assistance, please feel free to call me.

Sincerely,

A handwritten signature in black ink, reading "Drew R. Van Orden". The signature is written in a cursive, flowing style.

Drew R. Van Orden, PE
Senior Scientist

**Table 1. Polarized Light Microscopy (PLM) Results, EPA/600/R-93/116 Method
RJ Lee Group Project No. LSH202758**

Analyst: WHP

Analysis Report for VAI Simulations – Group # 2 & Group # 3

Sample ID	RJ Lee Group Sample ID	Building/location	Non-Asbestos Components	Asbestos Content	Comments
B-001 (Wallboard-Joint Compound) collected 3/5/02 analyzed 3/22/02	3030080 Layer #1 (Paper)	32 Cherokee Circle Averill Park, NY	Cellulose	100 %	None detected
	3030080 Layer #2 (Wallboard)		Gypsum Calcite Cellulose Quartz	90-90 % 5 - 7 % 4 - 6 % 2 - 3 %	White wallboard with Tan Paper. No joint compound on sample.
B-002 (Joint Compound) collected 3/5/02 analyzed 3/22/02	3030061	32 Cherokee Circle Averill Park, NY	Calcite Talc	95-98 % 2 - 4 %	Chrysotile <1 % Light tan joint compound
B-003 (Tape Lift) collected 3/5/02 analyzed 3/22/02	3030082 Layer #1 (Tape and Paint)	32 Cherokee Circle Averill Park, NY	Cellulose Opacques	90 % 10 %	None detected
	3030082 Layer #2 (Joint Compound)		Calcite Talc	95-98 % 2 - 4 %	Chrysotile <1 % White tape with white paint and light tan joint compound
B-013 (BULK) collected 3/7/02 analyzed 3/22/02	3030273	32 Cherokee Circle Averill Park, NY	Mineral wool Resin binder	95 % 5 %	None Detected Light yellow fibrous insulation

Samples were homogeneous, unless noted

Page 3 of 4

RJ Lee Group, Inc.
350 Hochberg Road
Monroeville, PA 15148

**Table II. Polarized Light Microscopy (PLM) Results, EPA/600/R-93/116 Method
RJ Lee Group Project No. LSH202758**

Analyst: WHP

Analysis Report for VAI Simulations -- Group # 2 & Group # 3

Client Sample No.	RJ Lee Group No.	Location	Moisture, %	Mass ≥ 500 μm , g	Mass < 500 μm , g	PLM Asbestos Concentration, %		
						≥ 500 μm	< 500 μm	Combined
B-004	3030063	Top	2.66	24.1683	0.1526	1.20	0.25	1.19
B-005	3030064	Middle	2.48	23.5877	0.2887	0.70	0.50	0.70
B-006	3030065	Bottom	2.90	17.6557	0.2041	0.50	0.25	0.50
		Combined	2.66	65.4117	0.6454	0.83	0.36	0.83
B-007	3030066	Top	2.93	24.6255	0.2476	0.40	0.25	0.40
B-008	3030067	Middle	2.36	23.5432	0.1620	1.80	0.75	1.79
B-009	3030068	Bottom	5.44	21.5099	0.4107	0.60	0.50	0.60
		Combined	3.52	69.6786	0.8203	0.93	0.47	0.93
B-010	3030069	Top	6.04	22.0421	0.1569	0.04	ND	0.04
B-011	3030070	Middle	1.50	22.8536	0.2473	1.90	0.75	1.89
B-012	3030071	Bottom	2.67	26.9234	0.2750	0.90	0.50	0.90
		Combined	3.33	71.8191	0.6792	0.95	0.50	0.95
B-014	3030274	Top	3.09	30.2009	0.2748	1.40	0.50	1.39
B-015	3030275	Middle	1.94	26.5405	0.5502	2.90	1.25	2.87
B-016	3030276	Bottom	1.47	38.9394	1.1482	3.40	0.75	3.32
		Combined	2.11	95.6808	1.9732	2.63	0.85	2.59
B-017	3030277	Top	6.96	25.2358	0.1810	0.50	0.75	0.50
B-018	3030278	Middle	2.70	23.38781	0.3651	0.20	0.25	0.20
B-019	3030279	Bottom	3.15	23.4066	0.3060	0.80	0.50	0.80
		Combined	4.33	72.0305	0.8521	0.50	0.45	0.50

The matrix material for all samples is vermiculite.
Unless noted, the samples were homogeneous.
The analyses were performed between 3/22/02 and 4/5/02.
Mass and asbestos concentration are reported on a dry basis.

[illegible]

[illegible]

sample # 3030273
 project # LSH202758
 J. R. Grace & Company
 I-013 (BULK) Group 3
 2 Cherokee Circle, Averill Park
 sample collected at site visit by DVO, CL

HJ Lee Group, Inc.
MATERIALS CHARACTERIZATION
USING POLARIZED LIGHT MICROSCOPY

Analyst W. Pavea
3 Scope 3-22-02

Building Name _____

Sample Gross Appearance Light Yellow Fibrous Insulation

Components

Comments

Vermiculite		
Perlite		
Chrysotile		
Amphibole		
Gypsum		
Calcite		
Mixed Clays		
Feldspar		
Quartz		
Titania		
Cellulose		
Magnesite		
Others	5	Resin Binder
Others	95	Mineral Wool

"Sufficient Material for Further Analysis" Yes No Comments

Sample # 3030214
 Project # LSH202758
 N. R. Grace & Company
 3-014 (TOP) Group 3
 32 Cherokee Circle, Averill Park
 Sample collected at site visit by DVO, CL

du Lee Group, Inc.
**MATERIALS CHARACTERIZATION
 ING POLARIZED LIGHT MICROSCOPY**

Analyst L. Puccio
3 Scope 4-4-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	99.1%	0.9%	Comments
	>500µm	<500µm	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	1.4%	0.5%	>500µm 0.4351 grams asbestos from Translucent-Actinolite <500µm Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opagues			
Others			

"Sufficient Material for Further Analysis" Yes No Comments Weight: >500µm 30.2009 grams
<500µm 0.2748 grams

Project # LSH202758
 J. R. Grace & Company
 -015 (MIDDLE) Group 3
 2 Cherokee Circle, Averill Park
 Sample collected at site visit by DVO, CL

no Lee Group, Inc.
**MATERIALS CHARACTERIZATION
 USING POLARIZED LIGHT MICROSCOPY**

Analyst Lee Powers
3 Scope 4-4-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	95.0%	2.0%	Comments
	> 500µ	< 500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	2.5%	1.25%	> 500µ 0.7527 grams asbestos from trans-actinolite, < 500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opaques			
Others			

*Sufficient Material for Further Analysis *Yes No Comments Weights > 500µ 26.5405 grams
< 500µ 0.5502 grams

W. R. Grace & Company
 B-016 (BOTTOM) Group 3
 32 Cherokee Circle, Averill Park
 Sample collected at site visit by DVO, CL

MATERIALS CHARACTERIZATION XG POLARIZED LIGHT MICROSCOPY

Analyst W. Pinner
3 Scope 4-4-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	97.1%	2.9%	Comments
	>500µ	<500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	3.4%	0.75%	>500µ 1.342 grams, asbestos-transilite-actinolite <500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opagues			
Others			

*Sufficient Material for Further Analysis *Yes No Comments Weight: >500µ 38.9354 grams
<500µ 1.1482 grams

Project # LSH202758
 R. Grace & Company
 017 (TOP) Group 3
 2 Cherokee Circle, Averill Park
 Sample collected at site visit by DVO, CL

du Lee Group, Inc.
**MATERIALS CHARACTERIZATION
 USING POLARIZED LIGHT MICROSCOPY**

Analyst W. Ponce
3 Scope 4-5-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	99.3%	0.7%	Comments
	>500µ	<500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	0.5%	0.75%	>500µ 0.1155 grams asbestos from Trans-Action, Inc. <500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opauques			
Others			

"Sufficient Material for Further Analysis" Yes No Comments Weight, >500µ 25.2358 grams
<500µ 0.1810 grams

Project # LSH202758
 R. Grace & Company
 018 (MIDDLE) Group 3
 Cherokee Circle, Averill Park
 Sample collected at site visit by DVO, CL

MATERIALS CHARACTERIZATION SINGLE POLARIZED LIGHT MICROSCOPY

Analyst W. Pinner
3 Scope 4-5-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	98.5% 1.5%		Comments
	>500µ	<500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	0.2%	0.2%	>500µ 0.0394 grams asbestiform Trem. Actinolite <500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opakes			
Others			

*Sufficient Material for Further Analysis *Yes No Comments Weight >500µ 23.3681 grams
<500µ 0.3651 grams

Analyst U. Pinner
3 Scope 4-5-02

Sample Gross Appearance

Tan Expanded Vermiculite

98.7% 1.3%
 $> 500 \mu m$ $< 500 \mu m$

Comments

Others

Comments

Weight, $\geq 500\mu$ 23.4066 gms.

сумма 0.3060 грам.

Polarized Light Microscopy Worksheet for Asbestos Analysis of Bulk Samples (Point Counts)

Date 4-5-02 Analyst Lee P. Pinner Scope 3Gross Sample
DescriptionTan Expanded Vermiculite

RJ Lee Group
Sample Number: Sample # 3030274
Project # LSH202758
W. R. Grace & Company
RJ Lee Group
Project Number: B-014 (TOP) Group 3
32 Cherokee Circle, Averill Park
Sample collected at site visit by DVO, CL

Comments /
of Layers

# of Preps	Homogenous		QC		QC					
	Y	N	Y	N	Analyst					
%	%	Asbestos Type	Morphology	Color / Pleochroism	Indices of Refraction	Birefringence	Sign of Elongation	Extinction Angle	NFM%	
		Chrysotile	W C S			L M	+	-		Quartz
		Amosite	W C S			L M	+	-		Tar
	0.5	Transect	W C S		1.635	L M	-	11		Perlite
		% Non-Asbestos Fibers	Optical Properties	layer sketch						Hydromagn.
		Cellulose								Feldspar
		Mineral Wool								Mica
		Fibrous Glass								Organic Part.
		Synthetic Fibers								Fine Grains
										Miscell. Particles
										Other
										Ashing Acid:
										Ash Time:

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
Transect			1			1			2
NAS	50	50	45	50	50	45	50	50	358

Date 4-4-02 Analyst Lee P. Pinner Scope 3Gross Sample
DescriptionTan Expanded Vermiculite

RJ Lee Group
Sample Number: Sample # 3030275
Project # LSH202758
W. R. Grace & Company
RJ Lee Group
Project Number: B-015 (MIDDLE) Group 3
32 Cherokee Circle, Averill Park
Sample collected at site visit by DVO, CL

Comments /
of Layers

# of Preps	Homogenous		QC		QC					
	Y	N	Y	N	Analyst					
%	%	Asbestos Type	Morphology	Color / Pleochroism	Indices of Refraction	Birefringence	Sign of Elongation	Extinction Angle	NFM%	
		Chrysotile	W C S			L M	+	-		Quartz
		Amosite	W C S			L M	+	-		Tar
	1.25	Transect	W C S		1.635	L M	-	11		Perlite
		% Non-Asbestos Fibers	Optical Properties	layer sketch						Hydromagn.
		Cellulose								Feldspar
		Mineral Wool								Mica
		Fibrous Glass								Organic Part.
		Synthetic Fibers								Fine Grains
										Miscell. Particles
										Other
										Ashing Acid:
										Ash Time:

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
Transect		1					2	2	5
NAS	50	45	50	50	50	50	45	45	355

✓ 1200 m Point Count

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
Tremolite			1		1	1			3
NAS	52	50	45	50	45	45	50	50	397

4500m Point Count

%	%	Asbestos Type	Morphology	Color / Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%	Handwritten Notes	
					⊥		⊥						
		Chrysotile	W C S					L M	+ -		Quartz	Carbonates	Vermiculite
		Amosite	W C S					L M	+ -		Tar	Binder	Oxides
	0.75	Tran-65	W C S	col	1	1.635	1.620	L M	6-	4	Perlite	Hornblende	Gypsum
		% Non-Asbestos Fibers		Optical Properties		layer sketch					Hydromagn.	Feldspar	Mica
		Cellulose									Clay	Organic Part.	Fine Grains
		Mineral Wool									Miscell. Particles	Other	
		Fibrous Glass									Ashing Acid:		
		Synthetic Fibers									Ash Time:		

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
Trem-Ac†			1		1			1	3
NAS	50	50	45	50	45	50	50	45	395

Polarized Light Microscopy Worksheet for Asbestos Analysis of Bulk Samples (Point Counts)

Date 4-8-02 Analyst C. P. Jones Scope 3Gross Sample
DescriptionTan Expanded Vermiculite
<500µ Point Count

RJ Lee Group
Sample Number: Sample # 3030278
Project # LSH202758
W. R. Grace & Company
B-018 (MIDDLE) Group 3
32 Cherokee Circle, Averill Park
Sample collected at site visit by DVO, CL

Comments /
of Layers

Stereo-scope	Client:	# of Preps	Homogenous	QC	QC						
		<u>8</u>	<u>Y</u> <u>N</u>	<u>Y</u> <u>N</u>	Analyst						
%	%	Asbestos Type	Morphology	Color / Pleochroism	Indices of Refraction	Birefringence	Sign of Elongation	Extinction Angle	NFM%		
		Chrysotile	W C S			L M	+ -		Quartz	Carbonates	
		Amosite	W C S			L M	+ -		Tar	Binder	
		<u>0.25</u>	<u>Tan Act</u>	<u>W C S</u>	<u>Lat N</u>	<u>1.635</u>	<u>1.120</u>	<u>L M</u>	<u>2 -</u>	<u>4</u>	
		% Non-Asbestos Fibers	Optical Properties	layer sketch						Hydromagn.	Feldspar
		Cellulose								Clay	Organic Part.
		Mineral Wool								Miscell. Particles	Other
		Fibrous Glass								Ashing Acid:	
		Synthetic Fibers								Ash Time:	

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
<u>Tan Act</u>					<u>1</u>				<u>1</u>
NAS	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>49</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>395</u>

Date 4-8-02 Analyst C. P. Jones Scope 3Gross Sample
DescriptionTan Expanded Vermiculite
<500µ Point Count

RJ Lee Group
Sample Number: Sample # 3030279
Project # LSH202758
W. R. Grace & Company
B-019 (BOTTOM) Group 3
32 Cherokee Circle, Averill Park
Sample collected at site visit by DVO, CL

Comments /
of Layers

Stereo-scope	Client:	# of Preps	Homogenous	QC	QC						
		<u>8</u>	<u>Y</u> <u>N</u>	<u>Y</u> <u>N</u>	Analyst						
%	%	Asbestos Type	Morphology	Color / Pleochroism	Indices of Refraction	Birefringence	Sign of Elongation	Extinction Angle	NFM%		
		Chrysotile	W C S			L M	+ -		Quartz	Carbonates	
		Amosite	W C S			L M	+ -		Tar	Binder	
		<u>0.5</u>	<u>Tan Act</u>	<u>W C S</u>	<u>Lat N</u>	<u>1.635</u>	<u>1.120</u>	<u>L M</u>	<u>2 -</u>	<u>4</u>	
		% Non-Asbestos Fibers	Optical Properties	layer sketch						Hydromagn.	Feldspar
		Cellulose								Clay	Organic Part.
		Mineral Wool								Miscell. Particles	Other
		Fibrous Glass								Ashing Acid:	
		Synthetic Fibers								Ash Time:	

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
<u>Tan Act</u>	<u>1</u>			<u>1</u>					<u>2</u>
NAS	<u>49</u>	<u>50</u>	<u>50</u>	<u>49</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>395</u>

Sample # 3030060
 Project # LSH202758
 W. R. Grace & Company
 B-C01 (Wallboard-Joint Compound)
 32 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

Analyst W. Paves

3 Scope 3-22-02

Building Name _____

Sample Gross Appearance white wallboard with Tan Paper - No Joint
Compound on sample

Components

Paper Wallboard

Comments

Vermiculite

Perlite

Chrysotile

Amphibole

Gypsum

Calcite

Mixed Clays

Feldspar

Quartz

Titania

Cellulose

Magnesite

Opagues

Others

	<u>100</u>	
	<u>5-7</u>	
	<u>2-3</u>	
<u>100</u>	<u>4-6</u>	

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: No Asbest-form Minerals Detected

Sample # 3030061
 Project # LSH202758
 W.R. Grace & Company
 B-002 (Joint Compound)
 32 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

Analyst Lee Powers
3 Scope 3-22-02

Building Name _____

Sample Gross Appearance Light Tan Joint Compound

Components

Comments

Vermiculite

Perlite

Chrysotile

Amphibole

Gypsum

Calcite

Mixed Clays

Feldspar

Quartz

Titania

Cellulose

Magnesite

Opagues

Others

<1		
95-98		
2-4		Talc

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: _____

Sample # 3030062
 Project # LSH202758
 J. F. Grace & Company
 -003 (Tape Lift)
 2 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

Analyst Lee Puma3 Scope 3-22-02

Building Name _____

Sample Gross Appearance White Tape with white paint and Light Tan Joint Compound**Components**

	<u>Tape and Paint</u>	<u>Joint Compound</u>	Comments
Vermiculite			
Perlite			
Chrysotile		< 1	
Amphibole			
Gypsum			
Calcite		95-98	
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose	50		
Magnesite			
Opagues	10		
Others		2-4	Talc

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: _____

Sample # 3030063
 Project # LSH202758
 W.R. Grace & Company
 B-004 (TOP)
 32 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

7-11-02

Analyst C. Powers

3 Scope 3-27-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	99.4%	0.6%	Comments
	>500µ	<500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	1.2%	0.25%	>500µ gram: 0.2582 gram asbestos from Trem - Act. <500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opagues			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: Weg. Fr. >500µ 24.1683 gram
<500µ 0.1526 gram

sample # 3030064
 project # LSH202758
 I. R. Grace & Company
 -005 (MIDDLE)
 2 Cherokee Circle, Averill Park
 sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

11/21/02

Analyst U. Pineda

3 Scope 3-27-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	96.8%	1.2%	Comments
	>500µ	<500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	0.7%	0.5%	>500µ 0.1554 grams asbestos from Trans-Act <500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opakes			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: Weight from 23.5877 grams
<500µ 0.2847 grams

Sample # 3030065
 Project # LSH202758
 R. Grace & Company
 006 (BOTTOM)
 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

12/10/02

Analyst L. Pardo

3 Scope 3-28-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	98.9% >50µm	1.1% <50µm	Comments
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	0.5%	0.25%	>50µm 0.4824 grams asbestiform Trem - Actinolite <50µm Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opakes			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: we, LT, >50µm 17.6557 grams
<50µm 0.2041 grams

✓
A/2/c2

3 Scope 3-28-02

Sample Gross Appearance tan expanded Vermiculite

"Sufficient Material for Further Analysis" Yes No Comments: Weight: 500g 24.625g
2700 0.277g

Sample # 3030067
 Project # LSH202758
 R. Grace & Company
 308 (MIDDLE)
 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

✓
 1/1
 8/2/02

Analyst Lee Powers
3 Scope 3-28-02

Building Name _____

Sample Gross Appearance Thin Expanded Vermiculite

Components	55.3%	0.7%	Comments
	> 500 μ	< 500 μ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	1.8%	0.75%	> 500 μ 0.4342 grams at best from Tren-ACT < 500 μ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opaques			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: Weight: > 500 μ 23.5432 grams
< 500 μ 0.1620 grams

ple # 3030068
 ect # LSH202758
 1. Grace & Company
 09 (BOTTOM)
 Cherokee Circle, Averill Park
 nple collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

6/2/02

Analyst L. P. Jones

3 Scope 3-24-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	96.1%	1.9%	Comments
	>500µ	<500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	0.6%	0.5%	>500µ 0.1397 grams asbestos from Trem-ACT <500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opakes			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: Weights >500µ 21.5059 grams
<500µ 0.4107 grams

Sample # 3030069
 Project # LSH202758
 W. R. Grace & Company
 B-010 (TOP)
 32 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

V V
 1 2 3 4 5 6 7 8 9 10 11 12

Analyst Lee Garrow

3 Scope 3-28-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	99.3%	0.7%	Comments
	> 500 μ	< 500 μ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	0.04%	0.0	> 500 μ 0.0075 grams asbestiform Trem-Act < 500 μ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opagues			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: Weight > 500 μ 22.0421 grams
< 500 μ 0.1569 grams

Sample # 3030070
 Project # LSH202758
 R. Grabe & Company
 111 (MIDDLE)
 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION USING POLARIZED LIGHT MICROSCOPY

11/10/03
 11/10/03

Analyst W. Pomeroy
3 Scope 3-28-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	98.9 %	1.1 %	Comments
	> 500µ	< 500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	1.9 %	0.75 %	> 500µ 0.4346 grams Asbestos Trem-Ach < 500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opagues			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: Weights > 500µ 22.8536 grams
< 500µ 0.2473 grams

Sample # 3030071
 Project # LSH202758
 W. R. Grace & Company
 B-012 (BOTTOM)
 32 Cherokee Circle, Averill Park
 Sample collected at site visit by WHP, DVO, CL

MATERIALS CHARACTERIZATION SING POLARIZED LIGHT MICROSCOPY

4/2/02

Analyst W. Penner

3 Scope 3-25-02

Building Name _____

Sample Gross Appearance Tan Expanded Vermiculite

Components	99.0 %	1.0 %	Comments
	> 500µ	< 500µ	
Vermiculite			
Perlite			
Chrysotile	0.0	0.0	
Amphibole	0.5 %	0.50 %	> 500µ 0.2444 grams asbestos from Truen - Act < 500µ Point Count
Gypsum			
Calcite			
Mixed Clays			
Feldspar			
Quartz			
Titania			
Cellulose			
Magnesite			
Opakes			
Others			

"Sufficient Material for Further Analysis" Yes _____ No _____ Comments: Weight > 500µ 26.9234 grams
 < 500µ 0.2250 grams

Polarized Light Microscopy Worksheet for Asbestos Analysis of Bulk Samples (Point Counts)

Date 3-25-02 Analyst Lee Paves Scope 3Gross Sample
DescriptionTan Expanded VermiculiteRJ Lee Group
Sample Number:
RJ Lee Group
Project Number:303 0063LSH 202758Comments /
of Layers< 500µm Point Count

Stereo-scope	Client:	# of Preps <u>8</u>	Homogenous <u>(Y)</u> N	QC Y N	QC Analyst				
%	%	Asbestos Type	Morphology	Color / Pleochroism II I	Indices of Refraction II I	Birefringence L M	Sign of Elongation + -	Extinction Angle	NFM% <u>55.75</u>
		Chrysotile	W C S			L M	+ -		Quartz Carbonates Vermiculite
		Amosite	W C S			L M	+ -		Tar Binder <u>Opacities</u>
	<u>0.25</u>	<u>Tran-Act</u>	<u>W C S</u>	<u>col</u> <u>N</u>	<u>1.635</u> <u>1.620</u>	<u>L</u> <u>col</u>	<u>col</u> <u>-</u>	<u>11</u>	Perlite Hornblende Gypsum
		% Non-Asbestos Fibers	Optical Properties	layer sketch					Hydromagn. Feldspar Mica
		Cellulose							Clay Organic Part. Fine Grains
		Mineral Wool							Miscell. Particles Other
		Fibrous Glass							Ashing Acid:
		Synthetic Fibers							Ash Time:

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
<u>Tran-Act</u>						<u>1</u>			<u>1</u>
NAS	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>45</u>	<u>50</u>	<u>50</u>	<u>375</u>

Date 3-25-02 Analyst Lee Paves Scope 3Gross Sample
DescriptionTan Expanded VermiculiteRJ Lee Group
Sample Number:
RJ Lee Group
Project Number:303 0064LSH 202758Comments /
of Layers< 500µm Point Count

Stereo-scope	Client:	# of Preps <u>8</u>	Homogenous <u>(Y)</u> N	QC Y N	QC Analyst				
%	%	Asbestos Type	Morphology	Color / Pleochroism II I	Indices of Refraction II I	Birefringence L M	Sign of Elongation + -	Extinction Angle	NFM% <u>55.1</u>
		Chrysotile	W C S			L M	+ -		Quartz Carbonates Vermiculite
		Amosite	W C S			L M	+ -		Tar Binder <u>Opacities</u>
	<u>0.25</u>	<u>Tran-Act</u>	<u>W C S</u>	<u>col</u> <u>N</u>	<u>1.635</u> <u>1.620</u>	<u>L</u> <u>col</u>	<u>col</u> <u>-</u>	<u>11</u>	Perlite Hornblende Gypsum
		% Non-Asbestos Fibers	Optical Properties	layer sketch					Hydromagn. Feldspar Mica
		Cellulose							Clay Organic Part. Fine Grains
		Mineral Wool							Miscell. Particles Other
		Fibrous Glass							Ashing Acid:
		Synthetic Fibers							Ash Time:

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
<u>Tran-Act</u>				<u>2</u>					<u>2</u>
NAS	<u>50</u>	<u>50</u>	<u>50</u>	<u>45</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>375</u>

Tan Expanded Vermiculite

303 2061

SVU Point Count

LSH 202758

Comments /
of Layers

Stereo-scope	Client:		# of Preps		Homogenous		QC		QC		NFM%		
			Y	N	Y	N	Y	N	Analyst				
%	%	Asbestos Type	Morphology	Color / Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle			
		Chrysotile	W C S					L M	+ -		Quartz	Carbonates	Yenicolite
		Amosite	W C S					L M	+ -		Tar	Binder	Opakes
	0.25	Trond	W C S			1.635	1.620	L M	-	41	Perlite	Hornblende	Gypsum
		% Non-Asbestos Fibers		Optical Properties		layer sketch					Hydromagn.	Feldspar	Mica
		Cellulose									Clay	Organic Part.	Fine Grains
		Mineral Wool									Miscell. Particles		Other
		Fibrous Glass									Ashing Acid:		
		Synthetic Fibers									Ash Time:		

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite						1			1
NAS	50	50	50	50	50	45	50	50	355

Tan Expanded Vermiculite

303 0066

GROUP Point Count

	Comments / # of Layers
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Stereo-scope	Client:	# of Preps		Homogenous		QC		QC Analyst					
		Y	N	Y	N	Y	N						
%	%	Asbestos Type	Morphology	Color / Pleochroism		Indices of Refraction		Birefringence	Sign of Elongation	Extinction Angle	NFM%		
		Chrysotile	W C S					L M	+ -		Quartz	Carbonates	Vermiculite
		Amosite	W C S					L M	+ -		Tar	Binder	Opalques
	0.15	Tronite	W C S			1.625	1.120	L M	+ -	11	Perlite	Hornblende	Gypsum
		% Non-Asbestos Fibers		Optical Properties		layer sketch					Hydromagn.	Feldspar	Mica
		Cellulose									Clay	Organic Part.	Fine Grains
		Mineral Wool									Miscell. Particles		Other
		Fibrous Glass									Ashing Acid:		
		Synthetic Fibers									Ash Time:		

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
Green-Act					1				1
NAS	50	50	50	50	49	50	50	50	399

Polarized Light Microscopy Worksheet for Asbestos Analysis of Bulk Samples (Point Counts)

Date 3-25-02 Analyst Lu. P. Pinner Scope 3Gross Sample
DescriptionTan Expanded VermiculiteRJ Lee Group
Sample Number:
RJ Lee Group
Project Number:303 0067LSH 202758Comments /
of Layers< 500 μ Point Count

Stereo-scope	Client:	# of Preps <u>8</u>	Homogenous <u>(Y)</u> N	QC Y N	QC Analyst						
%	%	Asbestos Type	Morphology	Color / Pleochroism 	Indices of Refraction 	Birefringence L M	Sign of Elongation + -	Extinction Angle	NFM%	<u>55-25</u>	
		Chrysotile	W C S			L M	+ -		Quartz	Carbonates	<u>Vermiculite</u>
		Amosite	W C S			L M	+ -		Tar	Binder	<u>Opakes</u>
	<u>0.55</u>	<u>Trans Act</u>	<u>W C S</u>	<u>Col N</u>	<u>1.635 1.620</u>	<u>L M</u>	<u>(+)</u>	<u>1</u>	Perlite	Hornblende	Gypsum
		% Non-Asbestos Fibers	Optical Properties	layer sketch					Hydromagn.	Feldspar	Mica
		Cellulose							Clay	Organic Part.	Fine Grains
		Mineral Wool							Miscell. Particles		Other
		Fibrous Glass							Ashing Acid:		
		Synthetic Fibers							Ash Time:		

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
<u>Trans Act</u>			<u>2</u>		<u>1</u>				<u>3</u>
NAS	<u>50</u>	<u>50</u>	<u>45</u>	<u>50</u>	<u>45</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>397</u>

Date 3-27-02 Analyst Lu. P. Pinner Scope 3Gross Sample
DescriptionTan Expanded VermiculiteRJ Lee Group
Sample Number:
RJ Lee Group
Project Number:303 0068Comments /
of Layers< 500 μ Point Count

Stereo-scope	Client:	# of Preps <u>8</u>	Homogenous <u>(Y)</u> N	QC Y N	QC Analyst						
%	%	Asbestos Type	Morphology	Color / Pleochroism 	Indices of Refraction 	Birefringence L M	Sign of Elongation + -	Extinction Angle	NFM%	<u>55-50</u>	
		Chrysotile	W C S			L M	+ -		Quartz	Carbonates	<u>Vermiculite</u>
		Amosite	W C S			L M	+ -		Tar	Binder	<u>Opakes</u>
	<u>0.50</u>	<u>Trans Act</u>	<u>W C S</u>	<u>Col N</u>	<u>1.635 1.620</u>	<u>L M</u>	<u>(+)</u>	<u>1</u>	Perlite	Hornblende	Gypsum
		% Non-Asbestos Fibers	Optical Properties	layer sketch					Hydromagn.	Feldspar	Mica
		Cellulose							Clay	Organic Part.	Fine Grains
		Mineral Wool							Miscell. Particles		Other
		Fibrous Glass							Ashing Acid:		
		Synthetic Fibers							Ash Time:		

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
<u>Trans Act</u>							<u>1</u>	<u>1</u>	<u>2</u>
NAS	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>45</u>	<u>45</u>	<u>397</u>

Polarized Light Microscopy Worksheet for Asbestos Analysis of Bulk Samples (Point Counts)

Date 3-25-02 Analyst L.P. Pinner Scope 3

Gross Sample Description

Tan Expanded VermiculiteRJ Lee Group
Sample Number:
RJ Lee Group
Project Number:303 00 65LSH 2027 rtComments /
of Layers< 500 μ Point Count

Stereo-scope	Client:	# of Preps <u>8</u>	Homogenous <u>(N)</u> Y N	QC Y N	QC Analyst						
%	%	Asbestos Type	Morphology	Color / Pleochroism II I	Indices of Refraction II I	Birefringence L M	Sign of Elongation + -	Extinction Angle	NFM%	<u>100</u>	
		Chrysotile	W C S			L M	+ -		Quartz	Carbonates	Vermiculite
		Amosite	W C S			L M	+ -		Tar	Binder	Opacities
			W C S			L M	+ -		Perlite	Homblende	Gypsum
		% Non-Asbestos Fibers	Optical Properties	layer sketch					Hydromagn.	Feldspar	Mica
		Cellulose							Clay	Organic Part.	Fine Grains
		Mineral Wool							Miscell. Particles		Other
		Fibrous Glass							Ashing Acid:		
		Synthetic Fibers							Ash Time:		

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
NAS	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>400</u>

Date 3-25-02 Analyst L.P. Pinner Scope 3

Gross Sample Description

Tan Expanded VermiculiteRJ Lee Group
Sample Number:
RJ Lee Group
Project Number:303 00 70Comments /
of Layers< 500 μ Point Count

Stereo-scope	Client:	# of Preps <u>8</u>	Homogenous <u>(N)</u> Y N	QC Y N	QC Analyst						
%	%	Asbestos Type	Morphology	Color / Pleochroism II I	Indices of Refraction II I	Birefringence L M	Sign of Elongation + -	Extinction Angle	NFM%	<u>55.21</u>	
		Chrysotile	W C S			L M	+ -		Quartz	Carbonates	Vermiculite
		Amosite	W C S			L M	+ -		Tar	Binder	Opacities
	<u>0.75</u>	<u>Tan-Act</u>	<u>W C S</u>	<u>col</u>	<u>2</u>	<u>1.25</u>	<u>1.20</u>	<u>6/-</u>	<u>11</u>		
		% Non-Asbestos Fibers	Optical Properties	layer sketch					Perlite	Homblende	Gypsum
		Cellulose							Hydromagn.	Feldspar	Mica
		Mineral Wool							Clay	Organic Part.	Fine Grains
		Fibrous Glass							Miscell. Particles		Other
		Synthetic Fibers							Ashing Acid:		
									Ash Time:		

Record Point Count Here
Enter % values above

Type	Slide 1	Slide 2	Slide 3	Slide 4	Slide 5	Slide 6	Slide 7	Slide 8	Total
Chrysotile									
Amosite									
<u>Tan-Act</u>		<u>1</u>		<u>2</u>					<u>3</u>
NAS	<u>50</u>	<u>45</u>	<u>50</u>	<u>48</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>397</u>

